Firmware Release Notes Ashtech OEM

Date: July 2nd, 2013

Product: HDS800

Subject: HDS800 V1.8 Firmware Release

**Introduction**

This document is the firmware release note of the HDS800 V1.8.

**Upgrade procedure**

The procedure to upgrade the receiver is the following:

1. Copy the file p\_800\_upgrade\_V1.8.S828Kv26.tar.bz2 to an USB memory key.
2. Make sure that there are at least 10Mb of free memory after having copied these files
3. Switch off the HDS800
4. Plug the HDS800 into an external power and make sure that there is also an internal battery
5. Connect the USB memory key to the HDS800
6. Turn on the HDS800 while keeping pressed the button ‘Scroll’ (during about 5 seconds)
7. Wait for the complete upgrade, which should take about 30 minutes.

**Firmware list and versions**

General version number: V1.8 – S828Kv26

* SYS: S227
* GNSS: Kv26
* RFS: 828
* BOOT LOADER: 1.1.5.9
* KERNEL: 2.6.19
* PMU: 2.31
* GSM: R7.46

The radio firmwares compatible with the HDS800 V1.8 are:

* Internal Pacific Crest ADL Foundation: 3.04 (2280, 2288 or 2300)
* External Pacific Crest ADL Vantage: 3.04 (2280, 2288 or 2300)
* External Pacific Crest ADL Vantage Pro: 3.04 (2280, 2288 or 2300)
* External Pacific Crest HPB: 2.58 or 2.42
* External U-Link: 1.03 (HW: AD), 1.04 (HW: AE) or 1.09 (With Connector)

The software compatible with HDS800 V1.8 are:

* FAST Survey: 3.0.3
* GNSS Solutions: 3.80.8
* RINEX Converter: 4.4.2
* Conf Radio: 2.3.2
* Spectra Precision Survey Pro: 5.2
* Spectra Precision Survey Office: 2.80

**New features**

1. **Dual RTK**: when 2 antennas are connected to the HDS800, the receiver is able to compute the RTK position for the both antenna using the same differential data coming from a base.
2. **Internal Relative RTK mode**: when 2 antennas are connected to the HDS800, the receiver is able to compute the vector between its both antennas.
3. **RTK + Internal Relative RTK mode**: when 2 antennas are connected to the HDS800 and differential data are received from another GNSS receiver, the receiver is able to compute the vector between its both antennas and the position (and vector) against the other GNSS receiver antenna.
4. **Dual Heading**: when 2 antennas are connected to the HDS800 and differential data are received from another GNSS receiver, the receiver is able to compute the heading between its both antenna and the heading between its first antenna and the other GNSS receiver antenna.
5. **New VE2 message**: this message is the same as the VEC message. It is used to output the internal vector when the mode *RTK + Internal Relative RTK* is enabled, the vector corresponding to the heading computation when the mode *RTK + Heading* are enabled, or the vector corresponding to the internal heading when the mode *Dual Heading* is enabled.
6. **New HD2 message**: this message is the same as the HDT message. It is used to output the internal heading when the mode *Dual Heading* is enabled.
7. **New AT2 message**: this message is the same as the ATT message. It is used to output the internal heading when the mode *Dual Heading* is enabled.
8. **VEC/VE2 message**: the vector components are expressed in ECEF (default) or ENU. The new command *$PASHS,VCT* allows to select the type of components to be outputted.
9. **NMEA output**: the receiver is able to output the NMEA messages corresponding to the first antenna, the second antenna or the both antenna to a specific port. This selection is done with the new command *$PASHS,NME,ANT* for each port. When both antenna are selected, the header *$PASHR,AN1* or *$PASHR,AN2* is added to the NMEA messages.
10. **ATOM output**: the receiver is able to output the ATOM messages corresponding to the first antenna, the second antenna or the both antenna to a specific port. This selection is done with the new command *$PASHS,ATM,ANT* for each port. The reference station ID for the second antenna is always 4095.
11. **SBAS manual selection:** it possible to select manually the SBAS satellite to be tracked by issuing the command *$PASHS,SBA,MAN*
12. **Reported SNR:** the algorithm was modified and now reported SNR appears to be more reactive and noisy in dynamic conditions.
13. **Extra CMR messages:** few encoded CMR messages are now processed by RTK rover; this brings performance enhancement against CMR VRS mount points.
14. **RTK engine tuned:** the RTK engine is fine-tuned to deliver higher fixed ambiguity solutions reliability; as a result one can expect lower fixed solutions availability in harsh conditions.
15. **GLO-only mode**: raw data output is now available in GLONASS only mode.
16. **Satellite reacquisition**: optimization of channel monitor resulted in faster GNSS L1 signal reacquisition.
17. **Multipath mitigation**: further optimization of Ashtech Strobe™ technique resulted to reducing CA L1 GPS and GLONASS code multipath error.
18. **Z-Blade performances**: further improvements with GLONASS data processing (especially against 3rd party bases/networks) resulted in enhanced Z-Blade performance.
19. **QZSS tracking**: the receiver is able to tracks the QZSS satellites, and they are used in position. By default, the QZSS tracking is not enabled. The new command *$PASHS,QZS,ON* allow to enable the QZSS tracking.
20. **GLONASS mode only**: the receiver is able to compute RTK position with only the GLONASS satellites and without receiving any GPS satellite.
21. **MT1030,1031**: the RTCM messages 1030 and 1031 are now decoded and processed by Z-Blade.
22. **New CMR messages**: some Trimble proprietary messages are now decoded and processed by Z-Blade.
23. **User Message**: there is now the possibility to output a user message on any port with the command *$PASHS,NME,USR*. This user message can be specified with the command *$PASHS,USR,TXT* or can be a GGA message with a position entered with the command *$PASHS,USR,POS*.
24. **Antenna height**: the maximum antenna height is now 100m. However the maximum antenna height written in raw data and broadcasted in differential messages remain 6.553m
25. **MT1025**: The receiver is able to process the RTCM message type 1025 and compute local projected coordinates. When local projected coordinate are computed, the receiver displays easting and northing coordinates on the OLED screen.
26. **$\_\_GMP:** the NMEA GMP message is now supported. It allows outputting the local projected coordinates when the RTCM message type 1025 is received and processed.
27. **Enable/disable a satellite:** there is now the possibility to enable or disable the tracking of a particular satellite, with the new command *$PASHS,GPS/GLO/SBA/QZS,USE*
28. **Wrong base position at the base:** an alarm is raised at the base when the base is transmitting a position too far from the computed position.
29. **Wrong base position at the rover:** an alarm is raised at the rover when the received base position is too far from the computed base position. Short term alarm can be raised when Network provider change reference data ID.
30. **Delete files**: it is now possible to delete all the G-Files or all the files from the internal memory by using the user interface of the receiver (buttons and OLED screen).
31. **Format memory**: it is now possible to format the internal memory by using the user interface of the receiver (buttons and OLED screen).
32. **XDL Rover**: the external radio XDL Rover is supported.
33. **GALILEO raw data**: the raw data output for E1 and E5 is enabled in ATOM RNX messages.
34. **GALILEO GIOVE-A/B**: the test satellite GIOVE-A and GIOVE-B are not tracked anymore, only the standard satellites are tracked.
35. **GALILEO navigation data**: the receiver outputs almanac and ephemeris for GALILEO satellite.
36. **GPS L5**: the raw data output for GPS L5 is enabled in ATOM RNX messages.
37. **Display**: one digit is added to the heading display.
38. **Heading**: the second GNSS Board is now turned on by default.

**HDS800 Web Server:**

1. **Rover setup**: the following rover modes are added to this page: *Internal Relative RTK only*, *RTK + Internal Relative RTK* and *Dual RTK*.
2. **Heading**: the mode *Internal and External* is added.
3. **GPS**: with the pages *Rover Setup*, *Base Setup* and *Heading* it is now possible to disable the GPS satellites tracking in order to activate the GLONASS only mode.
4. **QZSS**: with the pages *Rover Setup*, *Base Setup* and *Heading* it is now possible to enable or disable the QZSS satellites tracking.
5. **Data Output/NMEA messages**: each port can be assigned to the first antenna, the second antenna or the both antenna.
6. **Data Output/Raw Data**: each port can be assigned to the first antenna, the second antenna or the both antenna.
7. **Receiver Status and Settings**: many changes in order to take into account the new modes.
8. **Satellites**: a second page allows displaying the satellites tracked with the second antenna and the QZSS satellites are now displayed on the both pages.
9. **Russian**: the Web Server is translated into Russian language.

**Resolved Problems**

1. The command *$PASHS,FIL,D* could reset the receiver. This command was used by FAST Survey to delete a G-File from the memory. It works now properly.
2. **GLONASS network corrections**: by default, these corrections were ignored by the receiver in the RTK compution. They are now used by default, with the possibility to disable them with the command *$PASHS,CPD,NET*.
3. **Trimble CMR messages**: many new Trimble CMR messages are now decoded and processed by Z-Blade.
4. **Received base antenna height**: the command *$PASHQ,CPD,ANT* returned 0.0 as antenna height when no antenna height was received. Now it returns empty field.
5. **Reboot when no SIM card**: when the modem was in automatic power mode and there were no SIM card, the receiver may reboot automatically. This problem is resolved.
6. **Base auto-detection**: the auto-detection of the base manufacturer has been improved, so the performances against third party base have been improved.
7. **Antenna name with NONE**: antenna names are not checked for “NONE” radome name. Antenna name with this prefix is mapped to legacy name, which was without prefix.
8. **Coordinate Transformation**: in messages MT1021 and MT1022, "Undefined area of validity" is now considered as "Global area of validity".
9. **MAC correction**: MAC age is extended from 32 to 64 seconds.
10. **RMS**: the RMS reported by the receiver was too pessimist. This problem has been resolved.

**Known issues**

1. When you connect the HDS800 to a PC with the USB Cable and you delete some files of the internal memory with the Windows Explorer of the PC, the list of files returned by the *$PASHQ,FIL/FLS* commands are not correct anymore (so also files displayed by FAST Survey). It is necessary to perform a power cycle in order to retrieve a correct list of files.
2. When the command *$PASHS,RST* is issued, the message *GNSS Board not detected* may appear sometimes. Then after few seconds, the receiver works properly.

**Recommendations**

1. The new GSM Modem power consumption is higher in 3G mode than in 2G mode. When 2G is available, it is recommended to force the modem into 2G mode in order to increase the autonomy of the receiver.